DEXIS®

DICOM Conformance Statement

2.0

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Provision Dental Systems, Inc.

460 Seaport Court, Suite 101

Redwood City, CA 94063

(888) 883-3947

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1 Introduction

This chapter provides general information about the purpose, scope and contents of this Conformance Statement.

1.1 Scope and Field of Application

The scope of this DICOM Conformance Statement is to facilitate data exchange with the DEXIS® X-ray system and the DEXIS Software suite. This document specifies the compliance to the DICOM standard. It contains a short description of the applications involved and provides technical information about the data exchange capabilities of the equipment. The main elements describing these capabilities are: the supported DICOM Service Object Pair (SOP) Classes, Roles, Information Object Definitions (IOD) and Transfer Syntaxes.

The field of application is the integration of the DEXIS equipment into an environment of other medical devices and practice management software. This Conformance Statement should be read in conjunction with the DICOM standard and it's addenda.

1.2 Intended Audience

This Conformance Statement is intended for:

- system integrators of medical equipment,
- software designers implementing DICOM interfaces.

It is assumed that the reader is familiar with the DICOM standard.

Readers wishing to obtain more familiarity with the content and terminology of DICOM 3.0 Standard are encouraged to obtain and review the standard prior to reading this Conformance Statement. More information on acquiring this document and its updates on the DICOM standard may be found on the website of the National Electrical Manufacturer's Association (NEMA) at http://www.nema.com.

1.3 Contents and Structure

The DICOM Conformance Statement is contained in chapters 2 through 7 and follows the contents and structuring requirements of DICOM PS 3.2-2000.

1.4 Revision History

Revision	*Date*	*Description*	*Person*
1.0	*5 Nov. 2000*	*Initial Draft*	*M. Pfeiffer*
2.0	*1 Nov. 2002*	*Adaptation to CD-R Image Interchange Profile*	*H. Feuerhahn*

1.5 Definitions, Terms and Abbreviations Used

AE	DICOM Application Entity
CR	Computed Radiography
DICOM	Digital Imaging and Communications in Medicine
FSC	File Set Creator
FSR	File Set Reader
FSU	File Set Updater
IOD	DICOM Information Object Definition
RWA	Real-World Activity
SCP	Service Class Provider
SCU	Service Class User
SOP	Service-Object Pair
Tag	A 32 bit integer consisting of a group/element pair
UID	Unique Identifier
VM	Value Multiplicity
VR	Value Representation

1.6 References

DICOM standard:

PS 3.2-2000	Conformance
PS 3.3-2000	Information Object Definitions
PS 3.4-2000	Service Class Specifications
PS 3.5-2000	Data Structures and Encoding
PS 3.6-2000	Data Dictionary
PS 3.10-2000	Media Storage and File Format for Media Interchange
PS 3.11-2000	Media Storage Application Profiles
PS 3.12-2000	Media Formats

1.7 Trademarks

DEXIS is a registered trademark in the USA, UK, France, Germany, Belgium, Switzerland, Netherlands, Luxemburg, Sweden, Spain, Italy.

1.8 Connectivity and Interoperability

This Conformance Statement by itself does not guarantee successful interoperability of DEXIS equipment with non-DEXIS equipment or non-DEXIS software. The user (or the user's agent) should be aware of the following issues: The implementation of the DEXIS DICOM interface has been carefully tested to assure correspondence with this Conformance Statement. But the Conformance Statement by itself and the DICOM standard does not guarantee interoperability of DEXIS modalities and modalities of other vendors. The user (or the user's agent) must compare the relevant Conformance Statements and if a successful interconnection should be possible, the user is responsible to specify an appropriate test suite and to validate the interoperability, which is required. A network environment may need additional functions out of the scope of DICOM.

2 Implementation Model

The DEXIS Software Release 5 is a comprehensive range of software modules that allow for tailored solutions in the dental imaging field. The software applications are categorized in packages, for instance the DEXwrite package for referral letters. The Application Entity responsable for exchanging data is the "DEXIS Import/Export Application Entity", which is integrated into the DEXray

and DEXimage packages.

The DEXIS Software provides the following DICOM data exchange features:

- DEXIS can export DICOM File Sets to removable media; it thus serves as DICOM File Set Creator (FSC). If the images are not internally stored in DICOM file format, they are converted when exported.
- DEXIS can browse through DICOM File Sets on removable media and can import images from these File Sets; it thus serves as DICOM File Set Reader (FSR).

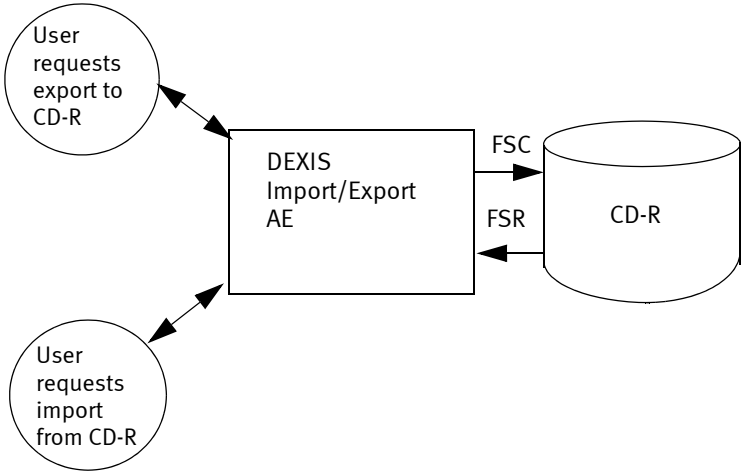
2.1 Application Data Flow Diagram

The DICOM import and export functionalities for the CD-R device are handled by the DEXIS Import/Export Application Entity (AE). The DEXIS Import/Export Application Entity is commanded by the user to perform DICOM services operating on the DICOM media through the use of buttons and menu selections on the graphical user interface of the station.

The user requests the creation of a DICOM file set by selecting the images in the list displayed by the export function and by selecting DICOM as the file format. By selecting a drive and optional folder the file set can either be created directly on a removable media (CD-R) or in some temporary folder on the hard disk and written to CD-R by selecting images in the local Browser, and by a drag and drop of those images on the CD-R icon.

The user can request the reading of a DICOM file set written on a CD-R by selecting the CD-R drive in the browser of the import function, and browsing the archive using the displayed folders and files. He can then import the selected items by double-clicking on them or by selecting them and clicking the “Import” button.

For the purpose of this Conformance Statement import and export is restricted to CD-R media, but the same methods can be applied to other removable media.



2.2 Functional Definition of Application Entities

The DEXIS Import/Export Application Entity supports the following functions:

- Can write a DICOM File Set (FSC) on a CD-R.
- Can read a DICOM File Set (FSR) on a CD-R.

2.3 Sequencing Requirements

Non applicable.

2.4 General Meta Information Options (see PS 3.10)

Implementation Class UID (0002,0012)='1.2.840.114059.1.1.6.1.50.1'.

Implementation Version Name (0002,0013)='DEXIS20021101'.

3 Application Entity Specifications

3.1 DEXIS Import/Export AE Specification

The DEXIS Import/Export Application Entity provides conformance to the Media Storage Service Class according to the following table

3.1.1 File Meta Information for the DEXIS Import/Export AE

Supported Application Profiles	*Real World Activity*	*Role*	*Service Class Option*
STD-GEN-CD	*Export to CD-R*	*FSC*	*Interchange*
STD-GEN-CD	*Import from CD*	*FSR*	*Interchange*

3.1.2 Real-World Activities for this Application Entity

3.1.2.1 Real-World Activity: Export to CD-R

The DEXIS Software acts as an FSC using the interchange option when requested to copy SOP Instances from the local data base to the CD-R.

3.1.2.1.1 DICOM Directory

The DEXIS Software writes directory records Patient, Study, Series and Image. Images are referenced via the Image Directory Entry attribute Referenced File ID (0004,1500). DEXIS does not employ Multi-Referenced Directory Entries.

3.1.2.1.2 SOP Specific Conformance

The file sets created by the DEXIS Software can contain information objects of the following SOP Classes:

Information Object Definition	*SOP Class UID*	*Transfer Syntax and UID*
Media Storage Directory Storage	*1.2.840.10008.1.3.10*	*Explicit VR Little Endian 1.2.840.10008.1.2.1*
Digital X-ray Image Storage - For Presentation	*1.2.840.10008.5.1.4.1.1.1.1*	*Explicit VR Little Endian 1.2.840.10008.1.2.1*
Digital Intra-oral X-ray Image Storage - For Presentation	*1.2.840.10008.5.1.4.1.1.1.3*	*Explicit VR Little Endian 1.2.840.10008.1.2.1*
VL Photographic Image Storage	*1.2.840.10008.5.1.4.1.1.77.1.4*	*Explicit VR Little Endian 1.2.840.10008.1.2.1*

3.1.2.2 Real-World Activity: Import from CD-R

The DEXIS Software acts as an FSR using the interchange option when requested to copy SOP Instances from the CD-R to the local data base.

3.1.2.2.1 DICOM Directory

The Import function of the DEXIS Software serves to import image file in all formats known to the software. If inside this function a location is selected that contains a valid DICOM data set, the DICOMDIR file is listed. When the user clicks on the DICOMDIR entry, all image files and descriptive information (patient name, image date, anatomic region) are listed, and the user can select the image files to import. If the patient names do not match, the user is asked for confirmation.

There are no requirements or restrictions on the contents of the DICOMDIR. If the DICOMDIR is missing, the media can be browsed and the individual image files can be imported anyhow.

3.1.2.2.2 SOP Specific Conformance

The Import function of the DEXIS Software accepts information objects of the following SOP Classes:

Information Object Definition	*SOP Class UID*	*Transfer Syntax and UID*
Digital X-ray Image Storage - For Presentation	*1.2.840.10008.5.1.4.1.1.1.1*	*Explicit VR Little Endian 1.2.840.10008.1.2.1*
Digital Intra-oral X-ray Image Storage - For Presentation	*1.2.840.10008.5.1.4.1.1.1.3*	*Explicit VR Little Endian 1.2.840.10008.1.2.1*
VL Photographic Image Storage	*1.2.840.10008.5.1.4.1.1.77.1.4*	*Explicit VR Little Endian 1.2.840.10008.1.2.1*

4 Augmented and Private Application Profiles

No augmented Application Profiles are supported.

5 Extensions/Specializations/Privatizations

The following restriction applies to SOP instances of the VL Photographic Image Storage Class:

The tag "Photometric Interpretation" (0028,0004) shall have one of the values: RGB or MONOCHROME2.

There is no restriction on SOP instances of the Digital X-ray Image Storage Class and on the SOP instances of the Digital Intra-oral X-ray Image Storage Class.

The Application Entity uses private tags according to the following description:

Name of Private Tag	*Tag*	*Description*
Private Tag Range	*(0029,0029)*	*Reserves the (0029,29xx) Range*

Description	*(0029,2920)*	*Environmental Description*
Orientation	*(0029,2921)*	*Computed Type and Orientation*
Parameter 1	*(0029,2922)*	*Various Parameters*
Parameter 2	*(0029,2923)*	*More Parameters*
Teeth	*(0029,2924)*	*ISO Tooth Descr.*
Jaw	*(0029,2925)*	*ISO Jaw Descr.*
Quadrant	*(0029,2926)*	*ISO Quadrant Descr.*
CRC	*(0029,2927)*	*CRC Check Sum*

6 Configuration

The DEXIS Software can be set to store all images internally in DICOM image file format; if this setting is on, and all images are stored in DICOM file format, no conversion is done when importing or exporting images in DICOM format. Images not stored internally in DICOM format are converted when exported; these images also contain all the necessary information.

7 Support of Extended Character Sets

The DEXIS Software will only create SOP instances containing the DICOM default character set as defined in PS 3.5.

8 Codes and Controlled Terminology

The SOP Classes supported by this implementation require the Codes and Controlled Terminology for the Anatomy Imaged according to PS 3.3 C.8.11.2 which are fully supported.